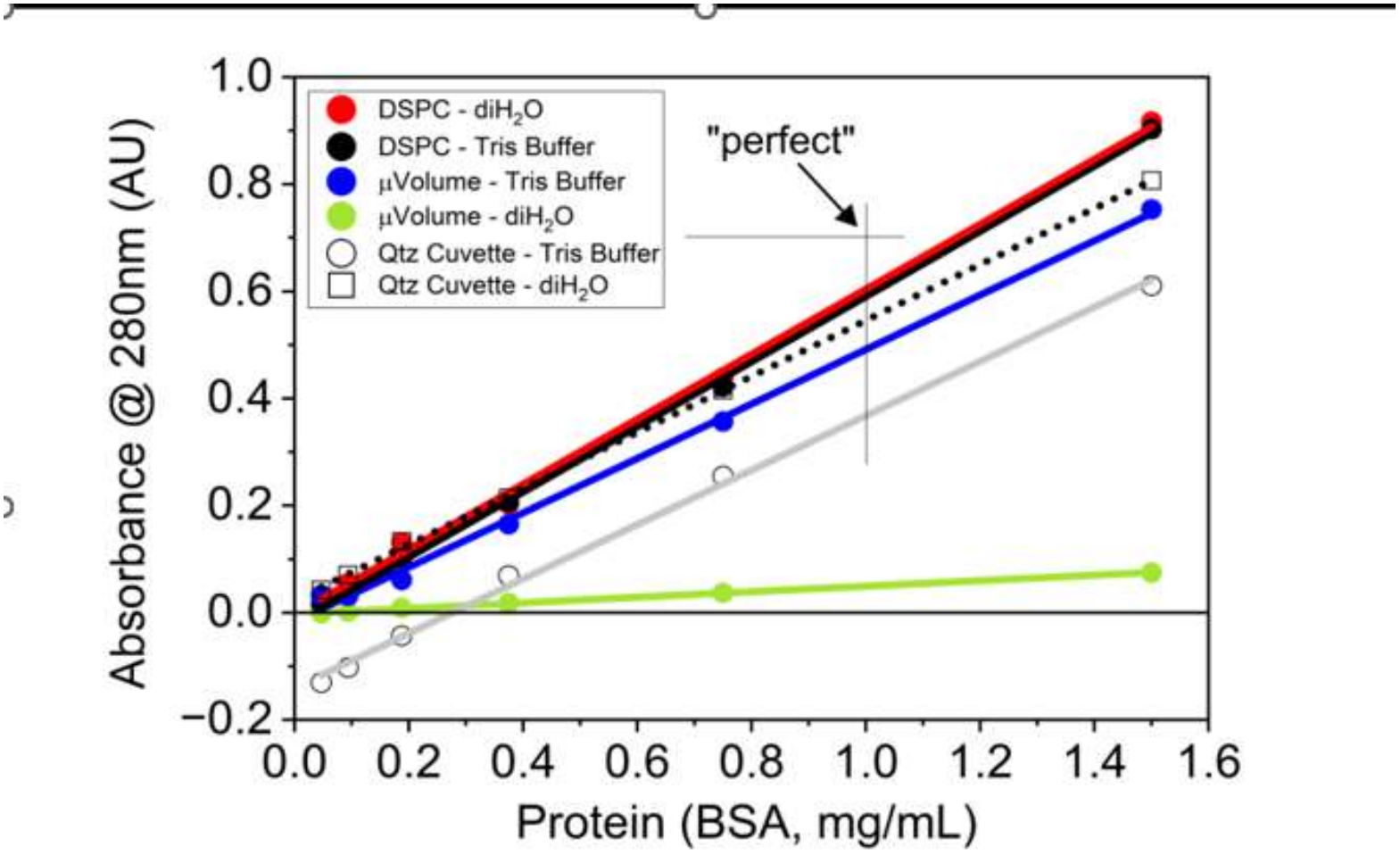
Comparing two technologies for 280 nm readings

NANODROP 2000

CLARITY IC280

How much deviation from "perfect" is acceptable?

Nanodrop (widely divergent blue & green) , CLARiTY (DSPC, overlaid red & black); cuvette spec (gray & dotted)



How much indifference to solvents/ interference would you like?

Linear Fit	dH_2O		
	Quartz Cuvette - Olis 8453	DSPC - Olis IC280	µVol - Nanodrop 2000
Slope - m	0.52	0.61	0.052
R^2	0.99	0.99	0.99
Intercept - b	0.02	-0.002	-0.002

Tris buffer (25mM pH 7)		
Quartz Cuvette - Olis 8453	DSPC - Olis IC280	µVol - Nanodrop 2000
0.51	0.61	0.51
0.99	0.99	0.99
-0.14	-0.02	-0.02

The Nanodrop has one claim to fame: 2 uL volume

Everything else is a cause for concern:

1. Inter-sample variation: your measurement is susceptible to artifacts caused by bubbles and inhomogeneous loading into the pedestal/ arm.

2. Sample inhomogeneity and matrix effects – things that cause scatter -- are amplified as sample volume goes down.

3. Pathlength 'correction' using their software is no panacea; it cannot be used indiscriminately without understanding the consequences.

4. Because the Nanodrop uses surface tension for the measurement, you are limited to solvents with proper surface tension (i.e., 100% water) or solvents which evaporate.

5. Microvolume measurements limit you to a narrow dynamic range and imprecise answers.

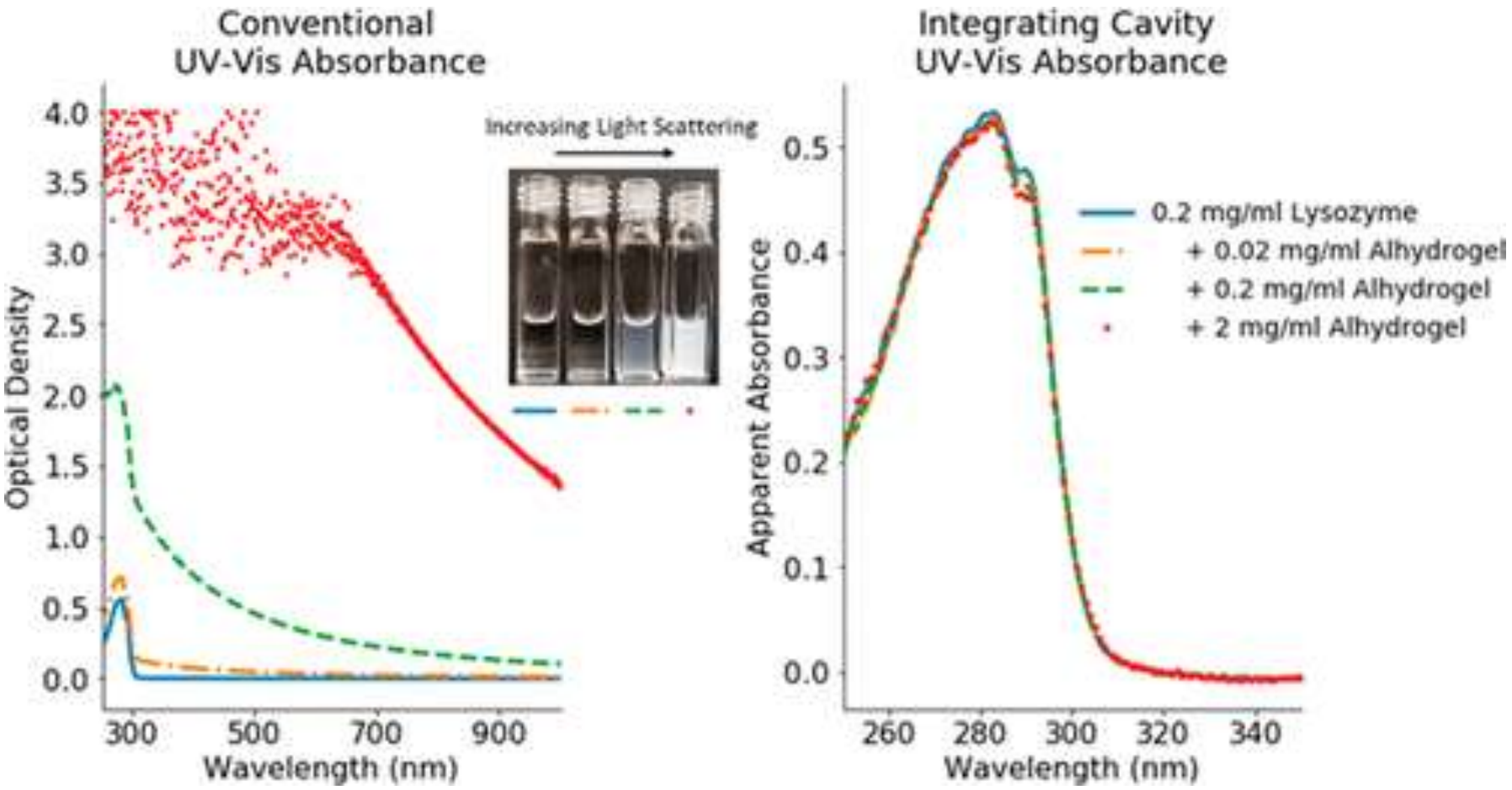
Using a Nanodrop is analogous to (the variability of) a Bradford assay rather than the gold standard of clinical laboratories, the BCA assay

The next slide shows one protein concentration in four solvents (a highly light scattering hydrogel)

These data from our scanning CLARiTY UV/Vis spectrophotometer led us to develop the single wavelength IC280, which we now recommend as the modern replacement for aging Nanodrop systems.

Protein in Any Solvent Is Fine.

AnalChem 2018: Label-Free, Direct Measurement of Protein Concentrations in Turbid Solutions with a UV–Visible Integrating Cavity Absorbance Spectrometer



When it comes time to replace your Nanodrop, think CLARiTY